

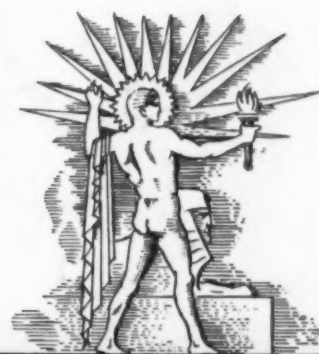
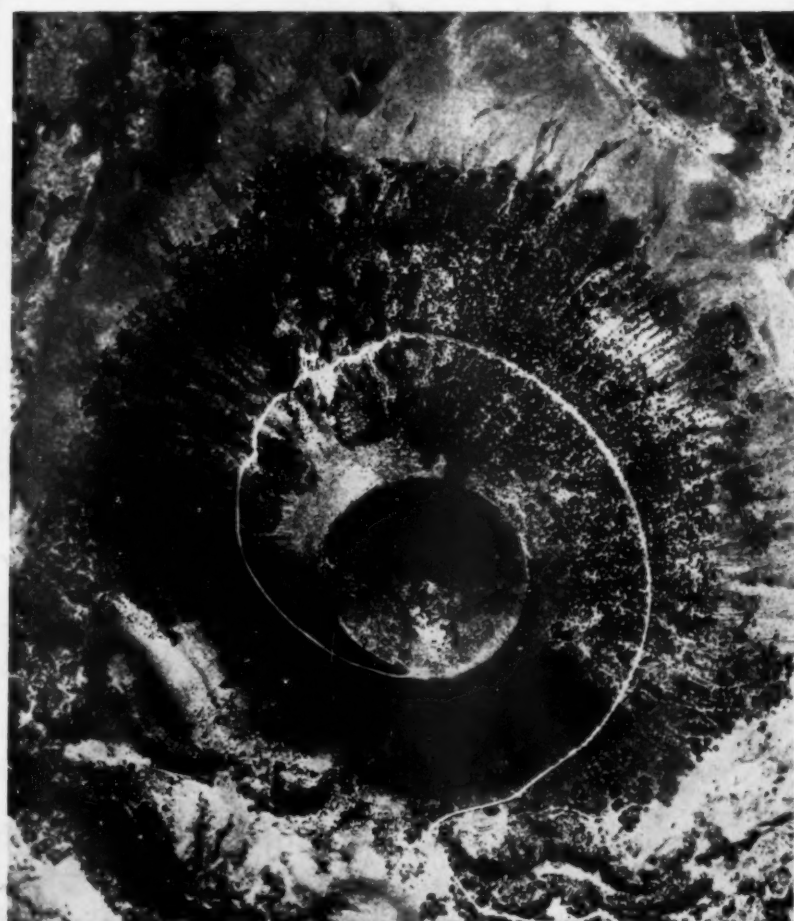
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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



March 12, 1938

Vulcan Unemployed

See Page 165

A SCIENCE SERVICE PUBLICATION

Do You Know?

Fish are accused as possible carriers of cholera.

A German engineer foresees ocean steamers equipped with wings like those of airplanes, to prevent rolling and to increase speed.

In making glass thread, over 300 miles of fiber can be blown from a little marble of glass weighing a quarter of an ounce.

The New York Zoological Park has acquired from South Africa a Potato Frog, which remarkably resembles the vegetable it is named after.

Paint for room walls should be a trifle lighter than the color wanted, because the wall surfaces will reflect one another, making the color seem deeper.

Several times recently banks of the Niagara River have been strewn with millions of fish, killed by polluted matter poured into the river from industrial plants.

Health education has helped, but styles in clothes have done the most to make women posture conscious, says Miss Dorothy Bateman of Cornell's physical education department.

Just 100 years ago an expedition sailed to check the fantastic theory that the earth was hollow with holes top and bottom through which men could enter the interior—and the expedition discovered the Antarctic continent.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

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What can doctors learn from the way a child treats a doll? p. 167.

RADIO

How can "hams" help when floods come? p. 168.

VITAL STATISTICS

Is there any difference between tobacco and alcohol in their effects on longevity? p. 163.

Navajo Indians use only about 15 per cent. of the wool from their flocks for their famous blanket weaving.

Over two million trees have been planted in Palestine to reforest the land, by aid of the Jewish National Fund.

A new kind of cotton gin separates seed from cotton by centrifugal force.

Accidents on the Mount Vernon Memorial Highway in Virginia increased 250 per cent. at night after lights were discontinued.

SCIENCE NEWS LETTER

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VITAL STATISTICS

Smokers Less Long-Lived; Heavy Drinkers Die Earlier

Hard Labor Does Not Affect Longevity at Ages Less Than 40, But After That Age It Does Shorten Life

SCIENTISTS can now tell you whether or not groups of men are marked for early death. They can do this while these men are still in good health, years before the first appearance of any signs of the disease that will eventually kill them.

The studies which make this possible were reported publicly for the first time by Dr. Raymond Pearl, professor of biology at the Johns Hopkins University, at a meeting at the New York Academy of Medicine.

Almost as startling was Dr. Pearl's announcement for the first time of new studies showing that tobacco smokers do not live as long as non-smokers. This conclusion was based on life tables for the number, out of groups of 100,000 non-smoking men, 100,000 moderate smokers (men) and 100,000 heavy smokers (men), who were still alive at each age level after 30 years. At age 60, for example, 66,564 of the 100,000 non-smokers were still living; 61,911 of 100,000 moderate smokers were living; and 46,226 of 100,000 heavy smokers were still living.

The studies show, Dr. Pearl said, "that smoking is associated with a definite impairment of longevity. This impairment is proportional to the habitual amount of tobacco usage by smoking, being great for heavy smokers and less for moderate smokers, but even in the latter sufficient to be measurable and significant."

The effect of tobacco smoking on length of life is different from that of alcohol, Dr. Pearl pointed out, in that moderate as well as heavy smokers live less long than non-smokers, whereas moderate drinkers do not have appreciably shorter lives than total abstainers, although heavy drinkers do.

The effect of hard physical labor on length of life was also studied by statistical methods. Up to the age of about 40 years, hard labor either indoors or outdoors has no effect on life expectation, Dr. Pearl reported, but after about age 40 such labor "definitely and considerably" shortens the length of life of the individuals.

Dr. Pearl, himself a biologist, emphasized that only a physician can give

advice on how to live a long life. No one else, he emphasized, can tell the layman where to find the modern equivalent of the Fountain of Youth.

"Such advice does not properly fall within the province or competence of the biologist or any one else outside of the medical profession," he said. "If the layman is wise he will turn to that profession, and that only, in his search for longevity. Most particularly he will do well to pay no attention whatever to the suggestions and advice of quacks, whether individuals or commercial corporations, however seductive and widespread their advertising may be."

It is the physician who will apply Dr. Pearl's findings to pick out in advance those persons destined to die early. They will do this by measuring physical, physiological, and genetic characteristics. For Dr. Pearl has found from studies of persons eventually dying of diseases of the heart and blood vessels that these measurements and facts distinguish the persons who are going to die relatively young from those who die of one of these conditions after living to a ripe old age.

Science News Letter, March 12, 1938

AVIATION

Tests Before All Flights Recommended for Pilots

TO DECREASE the increasing number of airplane crashes, simple instrumental tests of pilots before and after each flight are recommended by Drs. C. E. Ferree and G. Rand of the Research Laboratory of Physiological Optics in Baltimore (*Science*, Feb. 25).

They would have each pilot before the take-off and after each landing undergo a ten-minute test for swiftness of vision, performed by a flight surgeon. The instrument used is called a tachistoscope.

"More attention should be paid to fitness in the selection of pilots and to making sure that they are fit for service at all times when they are called upon to render service," Drs. Ferree and Rand report. "It is strange indeed that so much care is taken to see that the plane is in perfect condition before a flight is undertaken and so little attention is given to the condition of the pilot."

"While it is true that a human being can not be treated as a machine, we do know that he is subject to many disturbances from day to day that render him unfit for those services which require a supernatural fitness and profic-



SYNTHETIC DUST STORMS

Canadian scientists of the Swift Current, Saskatchewan, Soil Experiment Station are using two wind tunnels, one in the laboratory and the other in the field, to study the behavior of soil particles under a wind and thus get a clue to wind erosion. The field unit (above) can be readily moved. With it, studies of the rate at which the wind strips the topsoil and then allows it to settle again are to be carried out.

gency and involve a responsibility for human life and safety."

Tests after flights will tell how the aviator has stood the strain of service. Repeated tests on the aviator would show when he is becoming incapacitated for service through age or some other cause.

The instrument used was developed

from one devised by Drs. Ferree and Rand during the World War and used for testing army aviators. The test involves a measurement of the speed of vision, the speed of use of the muscles of the eyes in the perfect coordination needed for the clear seeing of a small detail, and the speed of accommodation.

Science News Letter, March 12, 1938

AVIATION

New Planes Will be Double The Size of Today's Largest

One New Airliner Type, Costing \$1,500,000 to Develop, Will Carry 42 Passengers at Speed of 200 Miles an Hour

AN INFANT aviation industry's wildest dreams of ten years ago are coming to life today in two airplane factories on the Pacific coast, where two land transport planes dwarfing all other landplanes ever built in the United States are rapidly nearing completion.

Today's biggest land transports weigh 24,000 pounds loaded. Tomorrow's—in the shape of the Boeing and Douglas ships now nearing the moment when test pilots will take them off the ground—will weigh 42,000 and 65,000 pounds respectively.

Remarkable for sheer size, the planes will also incorporate novel aeronautical features which will set them apart from the herd of today's planes.

Douglas' 42-passenger giant will have a wingspread of 138 feet. It will stand 24 feet, nearly three stories, off the ground. Sleeping 28 overnight passengers, the ship will be manned by a crew of five. Its engines will develop 5,600 horsepower for the take-off. Tests

will be run with a series of four Pratt and Whitney Twin Hornet engines and later with Wright engines. Ninety-seven feet long, the plane far eclipses in size anything but the largest clipper ships either recently completed or still under construction.

Boeing's 307, which will haul 33 passengers by day and 25 by night under the tutelage of a four-man crew, will weigh 42,000 pounds when complete. Seventeen feet high when standing on its landing gear, the Boeing job will have a wingspan of 107 feet and an overall length of 74 feet. Four Wright Cyclone engines will develop 4,400 horsepower.

Douglas' new airliner represents the combined resources of five major airlines and of the company which built the DC-3, most popular skyliner in America. One and a half million dollars will have been spent on its development by the time tests are complete and the first plane is turned over to the United Air Lines, its eventual owners.

United will not be able to use the ship, however, under the terms of the construction agreement, until Transcontinental and Western Air, American Airlines, Pan American and North American Aviation, Inc., the other four cooperating parties, have also received planes.

Boeing's ship is noted for its advanced streamlined design, adapted for high altitude flying. A number of the Boeing planes have already been ordered by TWA and by Pan-American. Sealed cabins will maintain an air pressure equivalent to that found at 8,000 feet while the plane cruises at an altitude of 20,000 to 25,000 feet over the bad weather below.

Douglas' liner will also be adapted for stratosphere flying, although this was not included in original plans.

Both ships will cruise at a speed of slightly less than 200 miles an hour and will land at speeds in the neighborhood of 65 miles an hour. They are intended for through runs on the transcontinental lanes rather than for local service, for many smaller airports will not be able to accommodate them.

Two striking features mark the DC-4. It will be the first large plane to be equipped with a tricycle landing gear, the third wheel being under the nose. As a result the ship will be in a horizontal position when standing on the ground. It will also be able to land in a smaller space and under less favorable wind circumstances. A second feature will be the triple rudder.

A separate 110 volt power supply on

THREE LAMPS

Three of the series of models in the Buffalo Museum of Science showing the evolution of the arts of lighting and warming dwellings. They might appropriately be titled the Age of Aristotle, the Age of Shakespeare, and the Age of Pasteur.



the Douglas plane will replace the 12-volt generators of past airliners. The change to such a power source, foreshadowed for commercial ships by its adoption on the Navy's new big bombers, is dictated by the increasing complexity of new instruments designed both for safety and to meet the passenger's comfort demands.

Science News Letter, March 12, 1938

VOLCANOLOGY—PHOTOGRAPHY

Extinct Cinder Cone Makes Striking Aerial Photograph

See Front Cover

RISING high above the New Mexico plains, a cinder cone, with its surrounding lava flows, attests to the rency of volcanic activity in the area where plateau and mountains are not far apart. Caught from the air during a Department of Agriculture survey, this photograph, taken with the camera pointing straight down into the crater, shows details never visible to an observer at ground level. The white spiral line leading from the lower center to the crater rim is a road.

Science News Letter, March 12, 1938

ETHNOLOGY

Too Hard or Too Soft—Life Sinks to Savagery

DO YOU ever wonder why you are civilized? And why millions of benighted savages still live Stone Age lives?

The answer is shown to the civilized public, vividly, in two new Halls of Man at the Buffalo Museum of Science.

Dr. Carlos E. Cummings, director of the museum, blames living conditions for the backwardness of our Stone Age contemporaries on earth. If conditions are extremely easy or extremely hard, mankind does not struggle upward.

The two new scientific exhibits which offer lessons in civilization are known as the Knox Hall of Primitive Races and the Knox Hall of Civilization. In miniature scenes modeled from everyday life, the halls drive home their lesson of primitive life, from poles to tropics, no more advanced in art, or invention than Stone Age man was thousands of years ago on earth; and in contrast the progress of civilized man, as he mastered writing, learned secrets of metals, devised comfortable transportation for himself, improved fruit and vegetables, and invented mechanical devices for the evolution of a machine age.

Science News Letter, March 12, 1938

AVIATION

Ultra-Short-Wave Beacons May Guide Future Aircraft

AMERICAN aircraft of the not-too-distant future may be riding static-free, low-power radio beacons broadcast on the hitherto unexplored ultra-short wavebands, promising experiments reported to the Bureau of Air Commerce by engineers of its Radio Development Section indicate.

Static, cut down but not conquered by recently-designed loop antennae for radio beacon frequencies now in use, disappears entirely from range broadcasts on ultra-high frequencies.

Low-powered ultra-short wave equipment of the type necessary for guiding the nation's air traffic would cost approximately one-fifth as much to install as does present-day equipment, J. C. Hromada, one of the reporting engineers, estimates.

Tests have been conducted at Indianapolis airport with both 63 megacycle (five meter waves) and 125 megacycle (two and a half meters) frequencies studied. An ultra-short wave receiver was adapted for airplane use in order to make flight checks. Present radio ranges sending guiding signals operate on the 200-400 kilocycle band (1,000 meters).

Multiple Coursing Dangers

The problem of multiple courses, one of the knottiest facing the men working with the present type of range broadcast, does not exist in the shorter waves, A. E. Harrison, one of the bureau's radio development engineers, declares. Multiple coursing is the splitting of the radio range over rough terrain, giving rise to more than one "course" a plane might follow. Multiple coursing has been held indirectly to blame in a number of airplane crashes in the past.

A major source of the economy of the ultra-short wave range, Mr. Harrison pointed out, is the fact that the expensive 125-foot towers, of which five are required for each station, necessary to carry the antennas used today, can be replaced in ultra-short wave range broadcasting by wooden poles not more than 50 feet high. Furthermore not nearly so much power is necessary. Use of ultra-high frequencies will not materially affect the size or weight of the

transmitter and receiver carried aboard the plane, it was stated.

Ultra-short waves do not travel beyond the horizon, thus limiting their usefulness for ordinary broadcasting. However, since the range broadcast is to a point in the sky and not to a point on the ground, the horizon limit is not a serious matter.

Two more experimental ultra-short wave transmitters are contemplated, it was learned. One is to be installed at Los Angeles and the other at Salt Lake City for further study.

Much Scrapping Necessary

Should the Air Commerce Bureau decide to shift from its present frequencies to the ultra-short waves, virtually every piece of radio range equipment would have to be scrapped. One estimate of the amount involved is \$25,000,000. However, that sum might be regained through improved service and greater economy of installation and operation of the new apparatus.

Development work was begun early last year, Mr. Hromada reveals. The 63-megacycle transmitter used in the tests was originally developed for the experimental weather-reporting radio-teletype circuit operated by the Bureau between Baltimore and Washington. Experiments begun at Silver Hill experimental radio station were transferred to Indianapolis because of the interference of two 125-foot steel towers installed at Silver Hill. The 63-megacycle transmitter has been installed at Pittsburgh and is now awaiting flight checking.

Airport traffic control tests with a 125-megacycle transmitter have also been carried out at Indianapolis. The experiments, reported by Mr. Hromada and W. E. Jackson, also proved encouraging. Freedom from static and from interference by nearby airport transmitters was marked, they declare. Two airplanes were used in the research.

Science News Letter, March 12, 1938

Bow-legs and cross-eyes were common among the Mayan Indians of Yucatan, because of their customs of caring for their children, Bishop Diego de Landa discovered in the sixteenth century.

BIBLIOGRAPHY

New Methods Vastly Increase Usefulness of Libraries

Books Otherwise Practically Unobtainable Distributed In Microfilm Form; Reading Machine Now Available

THE NON-PROFIT Bibliofilm Service, which copies research materials on microfilm, is now operating in three Washington libraries, those of the U. S. Department of Agriculture, the Army Medical Library, and the Library of Congress, it has been announced by Cuthbert Lee, newly-appointed Director of the American Documentation Institute.

Scholars and libraries desiring to have printed or manuscript material in these libraries may have this copying done on standard 35-millimeter microfilm. This service costs only a little more than a cent a page. The microfilm is read with a special reading machine which costs less than a typewriter. Copying is also furnished in the form of photoprints, readable with the unaided eye, at about ten cents per page.

Thousands of Services

"Bibliofilm Service began in 1934 and the volume of material copied for scholars has doubled each year," Mr. Lee explained. "Some 2500 scholars have been served with approximately 7000 items, totalling hundreds of thousands of pages. Through the vision of Miss Claribel R. Barnett, Librarian of the United States Department of Agriculture, that library was put in the front rank in its ability to supply this up-to-date service, with the essential cooperation and inventive genius of Dr. Ather-ton Seidell of the National Institute of Health, and of Lt. R. H. Draeger, M. C., U.S.N., Naval Medical School, and the organizing ability of Watson Davis, Director of Science Service.

"In the early stages adequate mechanisms had to be invented and constructed, and this pioneer development was likewise a cooperation, between Science Service, the Chemical Foundation, the Rockefeller Foundation, the U. S. Navy, the Department of Agriculture Library, the Bureau of the Census, the Works Progress Administration and the Library of Congress.

"No copying at low cost was possible until an adequate automatic camera was

created, equipped with a carriage which would adjust automatically to bring both pages of an opened book in the same flat plane, and operated by simple touch of an electric button, permitting work to be run through with speed and accuracy. The result was the building at a cost of several thousand dollars of the special Draeger copying camera installed in the Bibliofilm laboratories, where two more advanced Draegers are being constructed. For use by the individual and libraries an adequate reading machine at a reasonable price was also needed, and that was developed. It has been turned over to commercial manufacture, as American Documentation Institute and its Bibliofilm Service do not engage in the sale of mechanisms."

Mr. Lee also told how editors of learned journals can lessen the strain on their budgets by making use of the Auxiliary Publication Service operated by American Documentation Institute, which makes available microfilm and photoprints of typescript and illustrative material deposited with American Documentation Institute.

Fifty Societies Interested

Those engaged in scholarly and scientific work and other research may obtain full details about this non-profit service by writing to Bibliofilm Service, care of U. S. Department of Agriculture Library, Washington, D. C.

Fifty national scientific and scholarly societies, councils and other organizations have nominated members of the American Documentation Institute, which was organized last year to operate Bibliofilm Service and perform other functions in the field of documentation needed by scholarly and scientific societies.

Mr. Lee is a graduate of Harvard and he was formerly a special assistant to Ambassador Francis during the World War. He resigned to serve in France in a staff corps of the army and as liaison officer on the Peace Commission. Re-

cently he has engaged in banking and publishing activities.

He became familiar with research and library problems as the author of several works of scholarships, notably a history of the early American portrait painters published by Yale University, and the standard manual of personal trust administration used in 44 states.

As director Mr. Lee will have direct charge of the operating activities of the American Documentation Institute, which include microfilming in the Department of Agriculture Library, the Library of Congress and the Army Medical Library, and the distribution of research results through the medium of microfilm in cooperation with scientific and scholarly journals.

Science News Letter, March 12, 1938

PHYSIOLOGY

Large Gland in Chest Seen Responsible for Virility

AFRESH clue to the mystery of the thymus gland, with an important practical relationship to male virility, appears in research reported by Drs. J. Gershon-Cohen, Harry Shay and Samuel S. Fels of the Fels Foundation and Drs. Theodore and David Meranze of Mt. Sinai Hospital, Philadelphia. (*Science*, Jan. 7)

The thymus is the large gland situated in the chest. So far, no one has discovered what its function is. Thymus glands of animals are sometimes called sweetbreads. In humans the glands tend to grow smaller with age and large glands have been held responsible for sudden and otherwise inexplicable deaths of infants. X-ray treatments of large glands in babies have been given in the hope of preventing the so-called thymus deaths. Here seems to lie the important practical aspect of the Philadelphia doctors' research, although they do not call attention to it in their scientific report.

When they X-rayed the thymus glands of infant rats, they found a striking decrease in the weight of the sex glands with almost complete disappearance of the germ cells and loss of reproductive ability. When these thymus X-rayed males were mated to either X-rayed or normal females, no offspring were produced. The pituitary glands of the X-rayed males showed the typical picture of pituitary glands in castrated animals.

No such changes were found in the sex glands of the females after X-ray treatment of the thymus. Both sexes, however, showed a general slowing up

of bodily development as measured by weekly weighings. The thymus-destroying X-ray treatments were given within 48 hours after birth of the rats.

The Philadelphia doctors conclude that their findings "indicate a close relationship between the function of the thymus and the proper development of the testes."

Science News Letter, March 12, 1938

MINERALOGY

Photographic Film Aids Radium Tests

RADIOACTIVE minerals in a rare ore sample from Jimtown, Colo., were recently determined without destroying the mineral by Dr. E. N. Goddard, U. S. Geological Survey mineral expert, by a new use of the test by which radioactivity was first discovered.

Placing a polished face of the ore sample on a sheet of photographic film, and leaving it untouched for some time, Dr. Goddard was able to determine, after the film was developed, the presence of pitchblende, a strongly radioactive ore of uranium, by its intense black markings on the film, and cerite, a weakly radioactive ore of cerium, from its gray markings. Substances that were not radioactive left no marks on the film.

Later analyses of this ore sample showed that it was about 940,000,000 years old, placing it among the oldest rocks known, formed during the long eras before life appeared on earth.

Science News Letter, March 12, 1938

RADIOACTIVE FINGERPRINTS

At left, photograph of polished face of the Jimtown ore sample, showing extremely complex mineral structure; at right, print made from photofilm on which sample had rested. Brilliant white spots were caused by uranium and its decomposition-product, radium; gray areas are due to the feeble radioactivity of cerite and yttrocerite; black areas indicate non-radioactive minerals

PSYCHIATRY

Playing With Shy Children, Doctors Learn Their Troubles

Young Patients Identify Themselves With Their Dolls, Indirectly Disclosing Secrets That Gnaw Their Minds

PLAY as a method of treating children with mental difficulties, behavior problems and even excessive shyness claimed the attention of members of the American Orthopsychiatric Association at their meeting in Chicago.

How can maladjusted children be made to disclose the cause of their difficulties? "Active play" was the answer given by Dr. Joseph C. Solomon, the psychiatrist at the Baltimore Clinic of the Mental Hygiene Society of Baltimore.

The method consists in playing with dolls with the child. "Active play," according to Dr. Solomon, is a new method in which the children play a game about themselves without disclosing their own identities.

"By active play therapy," he said, "the psychiatrist is able to secure first hand information from the mouth of the child as to how he or she is reacting to his or her environment."

The young patient identifies himself with the doll, and in his play is prone to make the doll express his own feelings.

"The mere putting his thoughts into words plays an important role in the child's mental catharsis," Dr. Solomon said. "It is generally accepted that the aeration of the child's mental conflicts has beneficial treatment value."

Children are also encouraged, he said, to express their animosities, and to give physical expression to their hostilities, as well as to talk about them. After re-

peated demonstrations the patient no longer feels the need to express his hostility.

"It should be kept clearly in mind," Dr. Solomon warns, "that the method is partly a trick by which a child says things about himself that he ordinarily would not tell."

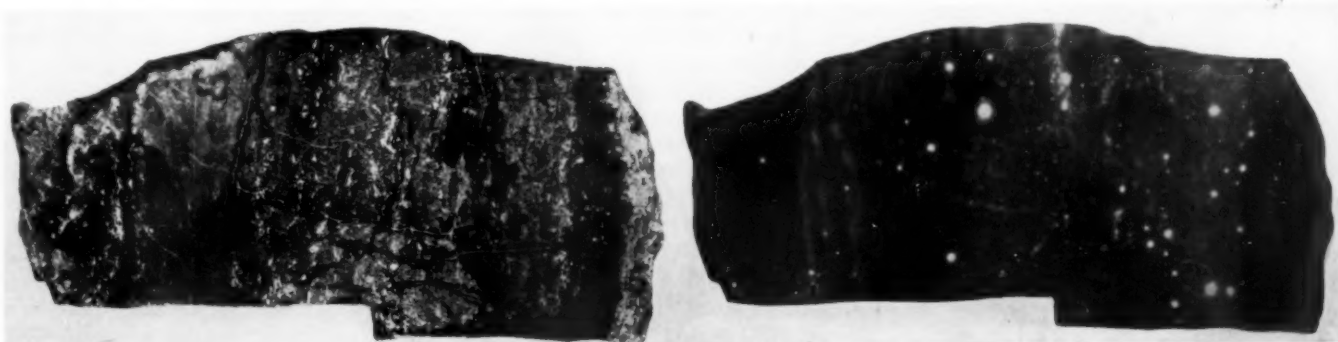
Resentment may result if the child feels he has been trapped. During the treatment the physician participates actively, and from time to time, as a suitable occasion arises, makes suggestions to direct the child's future thinking. Thus therapeutic suggestions are incorporated in the play.

Shy, withdrawn children may become normal under proper care in which play has a part, Pearl Lowenstein of the Jewish Children's Bureau and Margaret Svendsen of the Institute for Juvenile Research of Chicago have found. These workers studied the behavior of 13 girls and boys ranging in age from 6 to 8 years at a small farm camp.

Under the guidance of a psychiatric social worker who directed a program of play the children gradually lost their shyness and became active and aggressive. Other difficulties, shown in disturbed sleep, eating difficulties and nervous mannerisms, improved or disappeared at the same time.

The most encouraging thing about this study, they said, was the fact that the improvement was often maintained after the children returned to the old environment.

Science News Letter, March 12, 1938



RADIO

Radio Relay League Gets Ready for Spring Floods

THE END of winter brings the greatest hazard to the nation's communication channels. Floods, hurricanes, sleet storms and the other queer twists of the weather destroy wires and break the vital lines of communication during periods of greatest peril.

The disastrous Ohio River flood of last year has touched off the long-awaited spark needed to organize amateur radio on a nationwide basis, states the American Radio Relay League, at its headquarters in West Hartford, Conn. Already some sixty emergency coordinators of amateur radio have been appointed in sizable communities. The coordinators' job will be to organize their regions so that when floods or other catastrophes occur the amateur radio networks can go into effective action and carry the burden of communications traffic.

For two decades, notes the League's magazine QST editorially, the radio amateur has served emergency communication. Feats of personal heroism have been numerous. Occasionally small groups have joined forces. But there have been cases where delay, confusion, duplication of effort and all the other troubles have occurred. It is to prevent such happenings in the future that the present plans of the League are now being effected.

Science News Letter, March 12, 1938

PHYSIOLOGY

Vital Chemicals Made to Put Selves On the Spot

CERTAIN chemicals, among them phosphorus and the sodium of common table salt, are vitally needed by the body. Medical scientists have known this for some time from observing the disastrous results that occur when these chemicals are lacking from the diet which is the normal source of supply.

Knowledge of the part these chemicals play in the body—phosphorus as an aid in bone-building, for example—has been gained by examining and analyzing the bones and other body tissues after death, and correlating these observations of the amounts of each chemical in the various tissues with the observations of what happens when an animal is deprived of them.

Now scientists can get much more direct information about what happens

to some of these chemicals in the body and what they do there. The chemicals are made to put themselves on the spot and show where they are from the moment of entering the body until they leave it. This is done by adding to the substance under observation a bit of the same material, made artificially radioactive. That bit of material can be detected by the powerful rays it is constantly giving off, just as radium itself can be detected by its rays.

There is no danger from the artificial radioactive substances because they lose their radioactivity in a short time—14 hours in the case of radiosodium. In fact, this makes it necessary for very fast team work between the physicists who endow sodium or phosphorus with radioactivity and the medical scientists who use it for physiological studies.

Besides observing how substances such as phosphorus and sodium are used by the body, scientists, by tagging them with radioactive material, can learn how they are changed by disease and can check on radioactive treatment of cancer. Radioactive substances for such studies are now being produced in quantities by the University of California cyclotron under the direction of Prof. E. O. Lawrence.

Science News Letter, March 12, 1938

ANIMAL HUSBANDRY

Green Winter Fodder Grown Indoors in Trays

GREEN fodder for winter feeding to livestock is made from seeds in only six days in a device of British invention now being demonstrated at the New York Museum of Science and Industry at Rockefeller Center.

The "fodder factory" consists of an insulated cabinet containing a series of perforated trays. In these are placed quantities of grain, legumes, or other seed, after soaking for 24 hours. The trays are kept at constant temperature, and watered from the top.

At the end of six days, when the sprouts have reached a height of six inches, the entire contents of the trays—sprouts, soft seeds, and roots—are fed to the livestock, which relish the succulent fodder.

A larger cabinet than the one on display in New York is being tried out on a working scale at a large dairy farm in Connecticut. The "fodder factory" is an invention of Capt. H. H. B. Lund, of England.

Science News Letter, March 12, 1938

IN SCIENCE

EXPLORATION

Famous Russian Chemist Suggested Ice-Breaker

THE LENINGRAD State University has prepared for publication a memorandum by Russia's world-famous nineteenth-century chemist, Dmitri Ivanovich Mendeleev, advocating the use of an ice-breaker in an attempt to reach India from Russia by sailing around the north of Asia, Tass states.

The memorandum was addressed to Count Serge Julievich Witte, Russian statesman who was finance minister from 1893 to 1903, and prime minister of the Czar's government after the 1905 revolution. It contains a history of attempts to reach India by the northern sea route and asks for an ice-breaker to be placed at Mendeleev's disposal or for permission for the scientist to build one. The manuscript is supplemented by a design of an ice-breaker with special devices for crushing ice, designed by Mendeleev himself.

Mendeleev is noted throughout the scientific world as the chemist who drew up the periodic arrangement of the 92 elements; his achievement is ranked as one of the outstanding in the history of science.

Science News Letter, March 12, 1938

MEDICINE—PHYSICS

Largest Cascading Transformer Assembled

ENGINEERS at the Los Angeles Institute of Radiology are assembling the world's largest cascading transformer to step up power obtained from local power supplies to 1,000,000 volts to produce penetrating X-rays.

Five separate transformers, each stepping up the current by 200,000 volts, will be linked in series to produce a current that will generate extremely "hard" or short X-rays, useful in treating cancer. Only the penetrating short rays are useful for cancer, and the higher the generating voltage, the greater the percentage of the desired radiation. The installation is being made by Westinghouse engineers.

Science News Letter, March 12, 1938

SCIENCE FIELDS

MEDICINE

\$10,000 For Prizes in Research on Diseases

MORE than \$10,000 will be awarded in 1940, and similar prizes every seven years thereafter, by the American Academy of Arts and Sciences. The prize is to be awarded "for outstanding work with reference to the alleviation or cure of diseases affecting the human genital organs."

The award will be known as the Francis Amory Septennial Prize and is made in compliance with the requirements of a gift under the will of the late Francis Amory of Beverly, Mass.

No formal nominations, treatises or essays are required, but the Amory Fund Committee invites suggestions for the first award in 1940. It rests with this committee to decide whether the award shall be made at the end of any of the seven-year periods, and whether they shall be given to one or more individuals.

Further information may be obtained from the committee at 28 Newbury St., Boston.

Science News Letter, March 12, 1938

ETHNOLOGY

Irish Missionaries Spoke Own Language in Germany

IRISH missionaries who came to central Germany from the sixth to the eighth century, bringing the gospel that St. Patrick had carried to them still earlier, had no difficulty in making themselves understood. There were plenty of people in Germany at that time who spoke a Celtic language very similar to ancient Gaelic, is the belief of Prof. Emil Menke-Gluckert of the Dresden Technical College.

Evidence is scrappy and scattered, but in Prof. Menke-Gluckert's opinion sufficient. There are numerous place-names in central and western Germany that can be traced to a Celtic origin. A record of a notable sermon by a preacher named Gallus includes the statement that afterwards it was "interpreted" to a German-speaking audience at Constance by another priest; if Gallus had spoken Ger-

man, the services of an interpreter would not have been needed.

A telling point, the German scientist feels, is the total absence of any Celtic-German dictionaries or grammars dating from that period. Such bilingual aids are always among the first books developed in any foreign missionary effort. The only books of that date are Gospels and other devotional works in Latin, with glosses or marginal notes in Gaelic, never in German.

It is well known, of course, that the pre-German population of the Rhine and Danube valleys was Celtic. Prof. Menke-Gluckert's hypothesis is that when the conquering Germanic tribes moved in, they made themselves into an aristocratic class of masters, under whom the descendants of the original owners of the land lived as an inferior class, speaking their own language. Only after the rise of a dynasty of Frankish Christian kings who sought closer contact with Rome, he says, did the common use of the Celtic language, and with it the predominant influence of Irish missionaries, die out among the mass of the populace.

Science News Letter, March 12, 1938

PHILOSOPHY

Mental Expenditures Needed For Moral and Social Ends

FREEDOM of the human mind and the extension of its powers in the fields of religion, education, social institutions and personal relationships are urged as necessary to save civilization by Dr. Joseph K. Hart, of Teachers College, Columbia University.

The world today is half dogmatic and half experimental, Dr. Hart complains. The dogmatic half does not hesitate to make use of the machines, tools, and especially the weapons developed by the experimental half but fails to allow the extension of experimental methods into their own realm. The result, he foresees will be the use of the tools of research for the destruction of man and an eventual surrender of intellectual freedom in a world of stultifying despotism.

As a way out, he proposes matching the expenditures of mind for more than three centuries on natural theories, inventions and technologies, with an equal expenditure of mind in social and moral directions.

"In no other way," he says, "can social progress overtake material development and give to research technology the social direction that it has lacked these three hundred years."

Science News Letter, March 12, 1938

DOCUMENTATION

Documentation Conference To Be Held in Oxford

WORLD problems in documentation will be discussed at an international conference to be held at Oxford next September, Dr. S. C. Bradford of the Science Museum Library has announced.

Sir William Bragg, president of Britain's Royal Society, will be the president of the conference, which will be the fourteenth international gathering under the International Federation for Documentation, the organization which binds together those national associations devoted to the organization of knowledge in its broad aspects.

Specialists from many countries are expected to attend to read papers and discuss classification of knowledge, microfilming, archives, bibliographies, and many other subjects.

The World Congress of Documentation held last August at Paris asked the International Federation for Documentation to widen its scope and this year reports on the present state of bibliographical work in such fields of learning as archaeology, economics, history, linguistics, in addition to the natural sciences, are expected.

The international conference will be held Sept. 21-26, just prior to the meeting of Britain's national documentation organization, the Association of Special Libraries and Information Bureaux.

Science News Letter, March 12, 1938

ARCHAEOLOGY

Greek Acropolis Found Near Port of Marseilles

FOUNDATIONS of a Greek acropolis have been discovered near Marseilles by Henri Roland, archaeologist, of Saint-Remy.

The acropolis consists of a fort, apparently built by the Greeks who founded Massila, later Marseilles. The fort would have served to defend the plateau from invasion, and to cut off passage towards the north.

Greek coins from the period between the sixth century B. C. to the Christian era have been unearthed at the ancient fort, and also many pieces of broken pottery.

Archaeologists attach special interest to the discoveries, since ruins of the time of Greek influence in southern France are rare.

Science News Letter, March 12, 1938

ENGINEERING

Pictures Through a Pipe

Coaxial Cable Will Carry 2880 Telegrams Simultaneously; Economical in Operation Though Costly to Construct

By RONALD L. IVES

LIVING pictures, poured through a pipe for hundreds of miles and then sprayed on a screen, are the latest achievement of the designers of the coaxial cable, a message pipe that carries a television image, or 240 telephone messages, or 2880 telegrams simultaneously from one city to another with less loss of quality than any other cable yet designed.

Literally a pipe, the coaxial cable consists of a tube surrounding a wire, from which it is insulated with hard rubber spacers. This carefully suspended and insulated wire does not do all the work, by any means. The things that go on inside the hollow of the coaxial cable are very complex, and they are performed partly by the central wire, partly by the hollow space surrounding it, and partly by the inner surface of the tubular cable itself. There are several transmission jobs to do, and each part of the entire set-up carries its share of the load.

Multiple Carrying Job

For one thing, the coaxial cable has more to carry than its great complex of television, telephone, and telegraph circuits. The waves carrying these messages need to have new power put behind them every so often, to give them a boost and pep them up when they begin to grow weak and run down. The engineers therefore devised means for sending power over the cable along with the messages, so that repeaters at isolated points could be operated without the use of expensive local generating plants. Compressed non-inflammable gas within the tube keeps the inner wire and the insulating spacers dry, and a decrease in the gas pressure warns of trouble long before an actual breakdown occurs.

Recently, engineers of the Bell Telephone Laboratories sent newsreel pictures and sound from New York to Philadelphia via this cable. Using a screen eight inches square, images of a tennis game were received with such great clarity that the ball could be followed without difficulty. Motion picture

film was fed into the New York transmitter, where a $4\frac{1}{2}$ foot scanning disc, made from a circular saw, cuts the individual pictures up into 240 elements, each of which was transmitted on a separate frequency band to Philadelphia over the coaxial cable, received there, and projected onto a fluorescent screen by means of a stream of electrons.

Although it does not distort the signals to any extent, the coaxial cable conducts the different frequencies with slightly different speeds, and special equipment, to compensate for these delays, had to be invented and manufactured to compensate for this. Now, with these compensating devices, signals starting from New York at the same time arrive in Philadelphia within one quarter of a millionth of a second of each other.

Many Relays Needed

Signals traveling over the cable become weak rather rapidly. In the old days, a telephone call to San Francisco from New York was impossible unless an operator listened at Chicago and repeated the message received there into the San Francisco line. Today, vacuum tubes do the repeating in the same manner that the amplifying tubes in your radio make the weak signals picked up by the aerial audible all over the neighborhood. With the old multi-wire cables, a separate system was necessary for each pair of wires at each repeater station. Now, one repeater at each station does all the amplifying, saving cost, space, and trouble due to the complexity and number of the old style repeaters.

Repeaters on the coaxial lines are necessary at intervals of not more than ten miles. This means that between New York and Philadelphia there are ten repeater stations, each containing one repeater for each direction of transmission. Special repeaters had to be developed for use with this cable, and developing the special new style vacuum tubes caused designers and glass-blowers many a sleepless night.

Discovered two generations ago, the coaxial principle was useless to communication engineers until the development of the modern vacuum tube. Now, the

number of signals which can be simultaneously carried over the cable is limited only by the repeater and terminal equipment. The coaxial cable will carry anything that is fed to it. Engineers are now at work developing better feeding equipment.

Theoretically, the cable is very simple. Just put a wire inside a tube, with the center line of the wire on the center line of the tube, and you have a coaxial cable. Long ago it was discovered that a coaxial cable, in practice, worked almost exactly as called for by theory. The problem lay, not in making the cable work, but in making sections of cable more than a few feet long. Obviously, building two ninety-five mile lengths of cable in ten-foot sections, all



THE IMAGES START HERE

A rebuilt circular saw is used as a scanning disk at the Bell Laboratories in New York City, where images originate. So fast does this disk rotate that special equipment had to be designed to keep air friction from heating it dangerously. The metal casing by the man's hand is the ventilating housing around the scanning mechanism.

by hand, would make the cost prohibitive.

Telephone engineers had to lay aside their voltmeters and slide rules for a time and invent machinery that would make this cable in lengths of at least 500 feet. When this was done, a test section of cable, two miles long, was installed, and all possible difficulties solved before the dimensions of the long cables were decided upon. The finished New York-Philadelphia cable is only seven-eighths of an inch in diameter, and this includes two coaxial lines, eight ordinary wire lines, insulation, and a lead sheath. This is only one-ninth the size of a standard size toll cable.

Current Travels in "Skin"

Currents in the coaxial cable don't travel in the same manner as those in a lamp cord. High frequency currents, like those used in modern long-distance telephone transmissions, travel on the outer portions of the wires. The higher the frequency, the more they tend to travel in the surface of the wire, or "skin." Because of this, the outer tube of the cable carries the signals on its inner surface, while interfering currents, like "static," ride its outer layers, and cannot mix with the signals. As the signal frequencies increase, more and more of the current tends to travel as a radio signal, guided by the cable structure, and imprisoned by the outer tube.

Manufacturing of the final cable was done by machine, and lengths of more than five hundred feet were produced. Hard rubber insulating discs were stamped out of stock sheets, then cooled off until they were springy, and snapped onto the central wire at regular intervals.

Locked in Copper Jacket

Then the outer tube was spun on by special machines which assembled it from strips of rolled copper so shaped that they would interlock. This completed the electrical portion of the coaxial unit, but a double steel armor was necessary over the outer tube to protect it from crushing during installation. Two coaxial units and eight wires are bound together with paper wrapping and sheathed in lead to make the completed cable.

Before installation, each 500 foot length of coaxial cable was tested for each of several possible troubles, then sections were pulled into underground conduit, and the ends spliced, specially-designed tools being used in the work. Gas under pressure is contained in the

cable to keep the humidity constant. Any change in gas pressure indicates trouble in the cable, and by locating the pressure change, the defective section of cable can be cut out and replaced before an actual breakdown occurs.

Repeaters were placed in manholes along the route, each repeater being designed to operate for weeks or months without attention, and a special control current for the repeaters travels over the cable, one voice channel being devoted to it. Changes in temperature change the operation of the cable. Burying the cable reduces these changes, but special automatic compensators have been designed to eliminate their effects entirely.

Each repeater is as large as two good radio sets, and is shielded in a metal container similar to a radio shield. All repeater equipment, from the long-life filaments in the repeater tubes to the specially-insulated transformers and condensers, is designed to have an enormous margin of safety, for engineers have learned that breakdowns are expensive.

Increasing Number of Signals

Engineers have for years been harassed by the problem of where to put more wires, and how to increase the number of signals that can be sent over a single pair of wires. Long ago, methods of sending more than one signal at a time over a single pair of wires were developed, but the limitations of standard cable made application of these methods difficult, and impossible at higher frequencies. Television transmission, for example, must have channels that will carry very high frequency signals without distortion if a detailed image is wanted.

With the coaxial cable, now capable of carrying a million-cycle wave band, and using one set of repeaters at each station, much of the congestion trouble is solved. Once, 240 voice channels necessitated 240 repeaters. Now only one repeater, with correspondingly less power need and fewer chances of getting out of order, is needed. Nine coaxial cables can be installed in the conduits that now carry a single standard toll cable.

The problem of where to put more wires is by no means solved. In a few years, engineers will worry about where to put more coaxial cables. But the cable does make possible advances in the communication industry which will save it, for some years at least, from becoming bogged down by its own complexity.

Today, in the thickly-settled industrial

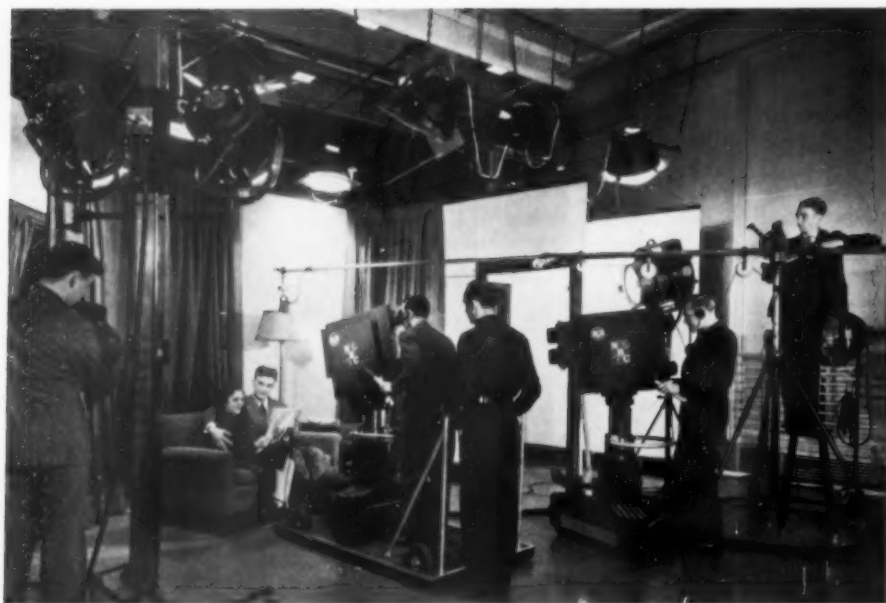


IT ISN'T VERY BIG

The coaxial cable is only seven-eighths of an inch in diameter, and within its lead sheath are two coaxial channels, each capable of carrying a million-cycle band, and eight wires for controls or any other desired use. So complex and difficult is the construction of this cable that special stranding machines had to be developed before construction was started, and special tools were invented for its installation.

areas, there is no such thing as a telephone wire, or a telegraph wire. Wire lines carry all sorts of communications. Only the very local lines have a single use. Trunk lines may be carrying at any time such widely diverse things as radio programs, telephone calls, telegrams, wirephotos, and even police alarms. As our civilization becomes more complex, the number of uses of a wire channel increases greatly.

Several generations ago, before the underground cable was developed, the tangle of overhead wires threatened to become unmanageable. Today, the underground cable sometimes becomes a problem, for it has to share the space under the paving and over the subway with power wires, gas, water and sewer pipes, often with steam pipes and pneumatic lines. Intercity lines have right-of-



SOON TO COME?

Television broadcasts to the general public have been predicted for many years, but the corner around which commercial television was reputed to be has not yet been found. Lack of transmission channels, one of the great obstacles, can be partly rectified by the use of coaxial cables for intercity transmission. High cost seems to be the chief remaining obstacle.

way problems which are becoming more acute each year.

Coaxial cables will not be a cureall, but they will allow service to be increased to nine times the present volume with the existing cable ducts. After that—but the engineers have enough trouble already!

Television broadcasting has long been cursed with a problem even worse than that of the telephone engineer. Television needs a very wide band of frequencies for a single image. These wide channels are available only on the very short waves, whose effective range is limited to "sight distance" from the transmitter. Rebroadcasting of the same program from many stations, which is standard practice today in sound broadcasting, has heretofore been impossible in the case of television because there were no wire channels between broadcasting stations over which the television signals could be sent for rebroadcasting. The coaxial cable, although designed as a communication channel, and not specifically as a "television pipe" may speed the coming of television broadcasts and rebroadcasts because it can carry the frequencies necessary for television transmission.

Television's future is very uncertain. Undoubtedly, more and better television transmissions will be available in the future, but whether that will be in a few

years, or a few decades, or a few centuries, the engineers will not predict. Ten years have already elapsed since television images were wired from Washington, D. C., to New York City. Great improvements have been made in the quality of the received image in that decade, but each improvement has necessitated a wider channel. Today, with modern technique, each line in the image requires as wide a channel as one telephone conversation. Hence, while a telephone conversation from New York to Philadelphia costs 65 cents in the daytime, a television conversation would cost \$156.65, if the rates were based on the channel width used.

Cost, rather than anything else, will be the major factor retarding television development. Few people, for example, could afford to make a television call from New York to San Francisco at rates based on channel use. If, as, and when people want to see their friends while telephoning to them, the channels will be in readiness. It seems, however, that a visit would be very much cheaper than a television interview.

Telephone engineers are not satisfied with their million-cycle cable. Why not use the cable to its full capacity? Why not install new terminal equipment and repeaters capable of handling two million cycles—why not five million? In the various communication laboratories

scientists are already making, testing, and improving repeater and terminal equipment to care for a band of two million cycles, which carry 480-line television images, 480 telephone or wire-photo signals, or 5760 telegrams.

If a 2½-million cycle band is made usable, television images eight inches high will have 65 lines to the inch, which will look better than the average newspaper illustration. Perhaps television will then become a pleasure, rather than a strain, to watch, and those who have the price can sit at home and observe activities anywhere in the world.

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Science News Letter, March 12, 1938

ARCHAEOLOGY

Hill Feared by Natives Yields African Secrets

A HILL with a tongue-twister name has been yielding graves and other clues to South Africa's past.

This hill named Mapungubwe is on the bank of Kipling's "great, greasy, grey-green Limpopo River."

Awe-struck natives always said climbing Mapungubwe meant death. Their ancestors had buried treasures up there, and no one dared even to point to the sacred hill, in the wild region where it lay.

But five years ago, a group of white men located the hill and found what they hoped for—buried treasure. It was, in fact, a skeleton with numerous ornaments of gold plate.

Fortunately, the treasure hunters were educated men, and one reported the find to the University of Pretoria. From then on, Mapungubwe has been probed by eager scientists, seeking a long-lost chapter of prehistory.

In a big archaeological volume called "Mapungubwe," Prof. Leo Fouche of the University of Pretoria and other scientists give a progress report.

Excavations have dispelled native mysteries, showing that the hill was occupied by two separate peoples. After several centuries, they left. There was no fighting, no hasty departure, judging by lack of confusion in the ruins.

But before the people went down the hill for the last time, they apparently buried their sacred objects with their chief. One grave, nicknamed the Scepter Burial, contained a skeleton buried with a gold scepter in one hand.

This episode in African prehistory

happened in the Middle Ages, so the evidence mainly suggests.

Archaeologists are now puzzled to know what these early Africans were like. Skulls they have seen are not true Negro type. They may represent a mixture, even including distant foreigners.

BOTANY

Seeds Sleep 60 Years, Sprout When Houses Fall

SNOW-WHITE'S long slumber, before the Prince kissed her awake, is made to seem a brief cat-nap by comparison with the record of tobacco seeds accidentally hidden under houses in Costa Rica. These tiny seeds have remained dormant as long as the houses stood—sixty years or more—and are aroused to germination and growth when the houses are knocked down by an earthquake or demolished by their owners.

The tale of the sleeping seeds was told by W. A. Archer, botanist for the U. S. Department of Agriculture, who has just returned after four years as a plant explorer in Latin America. Mr. Archer's special objective was to find new varieties of tobacco, but he has also brought back seeds of many other kinds of plants.

A couple of generations ago, he stated, a good deal of tobacco used to be raised in Costa Rica. In recent years the crop has been given up. But in the earth under the basementless houses are large numbers of tobacco seeds, and when a house is destroyed, rain and sun have a chance to make them grow. By collecting seed from these volunteer tobacco crops amid house ruins, Mr. Archer was able to save for experimental and breeding purposes a number of tobacco varieties long since out of cultivation.

Another find of possible importance

Urging extended digging to north and south of Mapungubwe, Prof. Fouche declares that deeper knowledge of native failures and achievements in Africa's past may aid Britain in improving its relations with native subjects.

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food, and that you can't trust the drinking water—and even less the native alcoholic beverages. However, he added philosophically, you can always eat bananas. They may become monotonous, but at least they're dependable.

Perils of snakes he shrugged off. In the whole four years, he declared, he saw exactly three wild snakes. The real danger in the American tropics comes from insects that carry a variety of most ungodly diseases.

Science News Letter, March 12, 1938

London is seeking to lessen its famous fogs by a campaign against smoke.

RADIO

March 17, 4:00 p. m., E.S.T.

ROOTS WITHOUT PLANTS—Dr. Philip R. White of the Rockefeller Institute for Medical Research.

March 24, 4:15 p. m., E.S.T.

EVOLUTION TO ORDER—Dr. Albert Blakeslee of the Carnegie Institution of Washington.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

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Leafy Umbrellas

PLANTS hold their leaves over their roots like umbrellas, thereby preventing much rain that might otherwise reach them from falling all the way to the ground. To that extent plants are their own enemies.

That trees do this sort of thing is something we have all experienced. Who has not sought shelter under the thick canopy of a big tree during a shower, even though the weather-wise counsel against it because of lightning risk?

But even humbler plants, the herbs of the prairies and meadows, also hold up leaf-umbrellas against these possible benefits to their roots. Dr. O. R. Clark of the University of Nebraska has made elaborate measurements of rain-interception by leaves of prairie herbs.

Dr. Clark simulated conditions of nature as nearly as possible. He laid out squares of prairie vegetation of known area ("quadrats"). One-fifth of each quadrat had the plants growing in shallow pans buried to the edges, so that the amount of water reaching the soil

could be accurately measured. Water was supplied from sprinkler bottles.

The proportion of water intercepted by the leaves varied greatly with the intensity of the artificial showers. A gentle one, of one-eighth inch in 30 minutes, could get only 26 per cent. of its water through a covering of buffalo grass to the soil beneath. A harder rain, a quarter-inch in 30 minutes, sent 69 per cent. of its moisture through to the

ground. A downpour of half an inch in half an hour got 83 per cent. through.

These interceptions of rain are practically all net loss to the soil, and of course also to the thirsty roots that are in the soil. The totals per acre are enormous. For instance, Dr. Clark calculates that wheat, intercepting 52 per cent of half an inch in half an hour, causes a loss per acre of over 29 tons of water.

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BIOCHEMISTRY

Washing Removes Vitamin D Raw Materials From Skin

YOU PLAY a few sets of tennis, or toss a medicine ball, or take some other kind of vigorous exercise in the sunshine. You come in to the shower feeling full of pep and vitamins. You rub yourself down briskly with a rough towel, and feel even better. But you've lost a good part of the vitamin you have just been acquiring!

For now it appears that the shower and rubdown that are orthodox parts of the American exercise and health ritual actually remove from the skin some of the stuff that vitamin D is made of. This is the conclusion of experiments at the Institutum Divi Thomae in Cincinnati, performed by Agnes C. Helmer and Rev. Cornelius H. Jansen.

In the experiments, groups of students, after exercising, had their bodies above the waist washed with clear water, which was all carefully saved and evaporated down. The terry cloths with which the students dried themselves were also saved. The residue from the washing and the terry cloths was ex-

tracted with ether, and the material thus obtained subjected to ultraviolet irradiation and fed to rats afflicted with rickets.

The defective bones of the rats healed up, showing that the athletes' "washings" had contained the precursor or raw material for vitamin D, which was then converted into the vitamin by the ultraviolet treatment.

In a second experiment the students were first irradiated with ultraviolet and the extracts then made in a similar manner. The results with rats proved that the washing had removed vitamin D itself from the boys' skins.

In their conclusions the experimenters state: "There is definite evidence that the secretions from the skin contain precursors of vitamin D, which after irradiation are due to be reabsorbed by the body, and the removal of which tends to produce a dearth of the vitamin unless it be supplied in some other form."

Science News Letter, March 12, 1938

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FORESTRY

Duke University to Have Graduate Forestry School

A GRADUATE school of forestry, the first of its kind in the South and the third in the United States, will be open for students next fall at Duke University. The other two are at Harvard and Yale universities.

No undergraduate courses will be given in the new school, and only candidates presenting bachelor's degrees, in suitable pre-forestry subjects, will be accepted. The course will lead to the degree Master of Forestry.

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•First Glances at New Books

Additional Reviews
On Page 176

Science—Illustration

SCIENTIFIC ILLUSTRATION—John L. Ridgway—*Stanford Univ. Press*, 173 p., illus., \$4. A guide and handbook to the many intricacies of putting pictures of all sorts in research publications. Even those who are not professional illustrators—or amateurs—will be interested in reading this book by the scientific illustrator of the California Institute of Technology and the Carnegie Institution of Washington.

Science News Letter, March 12, 1938

Peace

NORWAY AND THE NOBEL PEACE PRIZE—Oscar J. Falnes—*Columbia Univ. Press*, 332 p., \$3.50. That local background in the midst of which the Norwegian Storting's Nobel Committee and the Norwegian Nobel Institute have for nearly four decades administered the Nobel Peace Prize is the chief subject of this book.

Science News Letter, March 12, 1938

Anthropology

THE AMERICAN INDIAN (3d ed.)—Clark Wissler—*Oxford Univ. Press*, 466 p., illus., maps, \$3.75. A new edition of Prof. Wissler's well-known work is welcome, since it holds a distinctive place in anthropological literature. It includes data on archaeology, somatology, and ethnology, presenting a comprehensive picture of the native culture of the New World, thus far discovered.

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Archaeology

WINONA VILLAGE: A XIIITH CENTURY SETTLEMENT WITH A BALL COURT NEAR FLAGSTAFF, ARIZONA—J. C. McGregor—*Northern Arizona Society of Science and Art*, 53 p., illus., 75 c. A new phase of Southwest Indian culture, found at this ruined village, is described. The pattern of living is seen as a mixture of three Indian cultures: Pueblo, Hohokam, and Mogollon.

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Physics

A COLLEGE COURSE IN SOUND WAVES AND ACOUSTICS—M. Y. Colby—*Holt*, 356 p., \$2.80. A new college text for second-year physics students who have the background of the elementary general course.

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Mental Hygiene

A PEDIATRICIAN IN SEARCH OF MENTAL HYGIENE—Bronson Crothers—*Commonwealth Fund*, 271 p., \$2. The author is both a practising pediatrician and assist-

ant professor at Harvard Medical School. He writes for fellow pediatricians and medical educators as well as for mental hygienists on a subject of interest to all three.

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Astronomy

ANNALS OF THE ASTRONOMICAL OBSERVATORY OF HARVARD COLLEGE. Vol. 105: TERCENTENARY PAPERS—Harlow Shapley, Director—*Harvard Observatory*, 632 p., illus., \$8. Original reports of researches in astronomy, published in connection with the celebration of the Harvard Tercentenary. Some of them were presented in part at the time of the meetings and are here published in full; others are offered here for the first time. The greater part of the 32 papers are on galactic and spectrographic subjects.

Science News Letter, March 12, 1938

Geology

THE AGE OF THE EARTH—(New ed.)—Arthur Holmes—*Thomas Nelson*, 287 p., 60 c. A masterpiece of accurate, clear, understandable scientific writing brought thoroughly up to date. "Required reading" for all interested in earth sciences.

Science News Letter, March 12, 1938

Mythology

MOONS, MYTHS AND MAN—H. S. Belamy—*Harper*, 351 p., \$3. More ingenious than convincing is this author's rather strained effort to build up an entirely new cosmogony around a revision of the long-discredited "cosmic ice" theory.

Science News Letter, March 12, 1938

Archaeology—Agriculture

MOHENJO-DARO AND THE CIVILIZATION OF ANCIENT INDIA—N. C. Chaudhury—*Chem. Pub. Co. of N. Y.*, 30 p., \$1. Discusses particularly the agricultural crops and practices of India's earliest known civilization.

Science News Letter, March 12, 1938

Psychology

THE PSYCHOLOGY OF EARLY GROWTH—Arnold Gesell and Helen Thompson, assisted by Catherine S. Amatruda—*Macmillan*, 290 p., \$4. A technical work of interest to psychologists and others who measure the mental development of young children. This volume supplements previous reports of the Yale studies of infancy and "deals particularly with the biometric aspects of the normative investigation."

Science News Letter, March 12, 1938

Sociology

THE PUBLIC ASSISTANCE WORKER: HIS RESPONSIBILITY TO THE APPLICANT, THE COMMUNITY, AND HIMSELF—Russell H. Kurtz, ed.—*Russell Sage Foundation*, 224 p., \$1. Written by a group of experts in this field for the use of workers. The foreword points out that the emphasis is on the "human" rather than the routine aspects of the service rendered.

Science News Letter, March 12, 1938

Medicine

NAPOLÉON, A DOCTOR'S BIOGRAPHY—Boris Sokoloff—*Prentice-Hall*, 292 p., \$3.25. Napoleon, apparently, suffered from a surprising number of diseases, even at the height of his career. The author describes and interprets Napoleon's life as influenced by symptoms of these ailments.

Science News Letter, March 12, 1938

Psychology

EXPRESSIVE MOVEMENTS RELATED TO FEELING OF DOMINANCE—Philip Eisenberg—*Archives of Psychology*, 73 p., \$1. Do you read rapidly? Dr. Eisenberg has found that dominant men write more rapidly and walk more slowly than their more submissive fellows. In this volume this author makes a technical report of this and other findings.

Science News Letter, March 12, 1938

Child Psychology

THE DEVELOPMENT OF LINGUISTIC SKILL IN TWINS, SINGLETONS WITH SIBLINGS, AND ONLY CHILDREN FROM AGE FIVE TO TEN YEARS—Edith A. Davis—*Univ. of Minnesota*, 165 p., \$2. A technical report of interest particularly to educators and psychologists working with children of school age.

Science News Letter, March 12, 1938

Psychology

MIND IN TRANSITION—Joseph K. Hart—*Covici Friede*, 413 p., \$3.50. See page 169.

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Archaeology

MAPUNGBWE, ANCIENT BANTU CIVILIZATION ON THE LIMPOPO—Lea Fouché, ed.—*Cambridge (Macmillan)*, 183 p., 44 plates, 8 maps and plans, \$15. (See page 172.)

Science News Letter, March 12, 1938

Zoology

LABORATORY DIRECTIONS IN COLLEGE ZOOLOGY—(Rev. ed.)—Henry Lane Bruner—*Macmillan*, 163 p., \$1.75.

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•First Glances at New Books

Additional Reviews

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Biography

AUDUBON THE NATURALIST: A HISTORY OF HIS LIFE AND TIME—Francis Hobart Herrick—*Appleton-Century*, 500 p., illus., \$6. This is a second edition; but since the first edition appeared 21 years ago it practically counts as a new book. Despite the spate of Audubon books that has been flowing from the presses of late, this exhaustive, scholarly, richly illustrated work will easily hold its own. Audubon scholars and ornithologists generally will welcome opportunity to acquire a highly desirable work that has been out of print for some time.

Science News Letter, March 12, 1938

General Science

SCIENCE IN OUR LIVES—Benjamin C. Gruenberg and Samuel P. Unzicker—*World*, 750 p., illus., \$1.76. A textbook by the present authors can be depended on to be no routine job, but a thoughtfully developed presentation of carefully selected facts, designed not only to stock the young student's mind with essential information but to develop in him the scientific habit of thought.

Science News Letter, March 12, 1938

Gardening

GARDEN BULBS IN COLOR—J. Horace McFarland, R. Marion Hatton, Daniel J. Foley—*Macmillan*, 296 p., illus., \$3.50. Crocuses and precocious jonquils are already up in your garden; tulips and hyacinths will be along soon. Here is a book with many bright-colored pictures, and more in halftone, that tells about them.

Science News Letter, March 12, 1938

Physiology

SLEEP CHARACTERISTICS: HOW THEY VARY AND REACT TO CHANGING CONDITIONS IN THE GROUP AND THE INDIVIDUAL—N. Kleitman, F. J. Mullin, N. R. Cooperman and S. Titelbaum—*Univ. of Chicago Press*, 87 p., \$1. Report of an investigation by members of the physiology department of the University of Chicago. For scientific readers.

Science News Letter, March 12, 1938

Geology

THE GOLD MISSUS: A WOMAN PROSPECTOR IN SIERRA LEONE—Katharine Fowler-Lunn—*Norton*, 301 p., illus., \$3. It wasn't the gold that attracted Mrs. Fowler-Lunn, but the ceaseless search for it, the overcoming of obstacles placed in the way of the search by heat, and disease, and jungles and the madness that comes from solitude. Although it is primarily the story of a search for

gold, the book is also a valuable study of the psychology of a woman successfully chasing a dream that is usually a man's.

Science News Letter, March 12, 1938

Engineering

AIR CONDITIONING—FURNACES AND UNIT HEATERS—J. Ralph Dalzell—*American Technical Soc.*, 430 p., \$3. A text and reference book dealing with the application of gravity and mechanical furnaces, air conditioning for winter and summer, and the application of unit heaters in commercial and domestic heating.

Science News Letter, March 12, 1938

Biology—Medicine

THE SPAN OF LIFE—William M. Malisoff—*Lippincott*, 339 p., \$2.50. A discussion of what is dear to most of us and what we instinctively wish to cling to as long as possible. The author is editor of the "Philosophy of Science" and he treats his subject comprehensively, factually and philosophically.

Science News Letter, March 12, 1938

Social Economics

LIVING ON A MODERATE INCOME: THE INCOMES AND EXPENDITURES OF STREET-CAR MEN'S AND CLERKS' FAMILIES IN THE SAN FRANCISCO BAY REGION—Emily H. Huntington and Mary Gorringer Luck—*Univ. California Press*, 206 p., \$2. Issued under the auspices of the Heller Committee for Research in Social Economics of the University of California, and the American Council of the Institute of Pacific Relations. Actual expenditures for specific items are shown in the numerous tables.

Science News Letter, March 12, 1938

Biology

LABORATORY MANUAL FOR GENERAL BIOLOGY—Leslie A. Kenoyer and Henry N. Goddard—*Harper*, 73 p., XXVII plates, 75 c.

Science News Letter, March 12, 1938

Geography

IN LITTLE AMERICA WITH BYRD—Joe Hill, Jr., and Ola Davis Hill—*Ginn*, 264 p., illus., \$1. The youngest man on the second Byrd expedition, collaborating with his mother, has given us a very attractive book about life in the Antarctic. It is intended primarily for school children, but the simple, informative style and the numerous pictures make it "good reading" for any age.

Science News Letter, March 12, 1938

Conservation

THE RIVER—Pare Lorentz—*Stackpole*, 64 p., pictures and text, \$2. Dynamic pictures, captioned in blank verse, freighted with grim warnings of the floods and storms of future years; warnings of starved and denuded lands, poverty-stricken people, starving cattle, ruin, desolation; yet carrying at the same time a gleam of hope—hope that the river can be controlled, the lands salvaged, the people rehabilitated. Disquieting, thought-provoking, almost terrifying, is the dramatic message carried by this book. Those who have seen the film "The River," which Mr. Lorentz also edited, will want this book as a means of keeping their memories vivid.

Science News Letter, March 12, 1938

Bioclimatics

BIOTHEMATICS, A SCIENCE OF LIFE AND CLIMATE RELATIONS—Andrew Delmar Hopkins—*Govt. Print. Off.*, 199 p., 35 c. The author undertakes an entirely new science, based on mathematical treatment of solar and other extra-terrestrial factors, as modified by local and regional conditions on earth, and as reaching final expression in the growth and behavior of living organisms. With so many variables involved, the task obviously presents some rather terrific difficulties, toward the solution of which Dr. Hopkins has spent a lifetime of labor.

Science News Letter, March 12, 1938

Dendrology

VIRGINIA TREES: VOL. I, THE CONIFERS—William Harrison Lamb—*Manassas Journal Press*, 112 p., \$2.50. Written by one who knows the Virginia forests intimately, this pioneer book on Virginia trees may be expected to have considerable usefulness within its range which of course extends beyond the borders of the state. Presumably other volumes are to follow, describing Virginia's great wealth of deciduous trees.

Science News Letter, March 12, 1938

Adventure

DANGER IS MY BUSINESS — John D. Craig—*Simon and Schuster*, 308 p., \$3. A deep-sea diver (who has done other risky things, too) regales us with hair-raising tales about his adventures at the bottom of all the Seven Seas, and on lands adjacent thereto, and he winds up with an account written in the future tense, of the salvaging of the gold on the sunken *Lusitania*.

Science News Letter, March 12, 1938